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EXAMINER	
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ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 09/28/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

Office Action Summary	Application No.	Applicant(s)	
	09/521,901	YAMAKAWA, TSUTOMU	
	Examiner	Art Unit	
	Shun Lee	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *13 April 2000* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *09 March 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) *4* .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Drawings

1. The drawings are objected to because:

(a) in Fig. 2, "THE NUMBER OF PHOTO" should probably be --THE NUMBER OF PHOTONS--;

(b) in Fig. 3, "ENERGY OF INCEDENCE GAMMA RAY (E0(MeV))" should probably be --ENERGY OF INCIDENCE GAMMA RAY (E0(MeV))--; and

(c) in Fig. 4, "P2(E1)" should probably be --P2(E2)--.

Correction is required.

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: BS (pg. 22, line 2). Correction is required.

Specification

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 13 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 13 recites the limitation "the second case" in line 1 on pg. 10. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 1, 3-7, 11, 12, 14, 16, 17, 20, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Kamae *et al.* (US 4,857,737).

In regard to claim 1, Kamae *et al.* disclose a nuclear medical diagnostic apparatus comprising:

(a) at least one radiation detector (20, 21, and 22 in Fig. 9) having a plurality of semiconductor cells which are arranged in a matrix, detect radiation separately, and output signals representing an energy of the radiation separately (column 6, lines 6-58, column 7, lines 35-44);

(b) a selection circuit (*i.e.*, anticoincidence counter, see Fig. 4C) which, in order to select, among events wherein the radiation is detected, a specific event wherein a radiation derived from radio-isotope injected to a subject is detected (column 1, lines 21-40), in a first case wherein either one of said semiconductor cells output a

signal, compares an energy of the signal (*i.e.*, 511 keV) with a predetermined energy window (*i.e.*, D1 in Fig. 6, column 10, lines 54-62, column 1, lines 24-31), and in a second case wherein not less than two semiconductor cells output not less than two signals substantially simultaneously, calculates a total energy of the not less than two signals and compares the total energy with the predetermined energy window (column 7, lines 47-68);

(c) a position calculation circuit which, in the second case (column 8, lines 1-24), calculates an incidence position of the radiation on the basis of a position of either one semiconductor cell among said not less than two semiconductor cells (in the first case, it should be noted that it is inherent in the apparatus Kamae *et al.* to calculate an incidence position of the radiation on the basis of a position of said semiconductor cell that has output the signal since all of the energy of the 511 keV photon has been measured and thus there is no other signal from the rest of the semiconductor cells, column 1, lines 21-40, column 3, lines 40-45);

(d) a counting circuit (15 and 16 in Fig. 7) configured to count the specific event in association with the calculated incidence position (column 8, lines 61-67); and

(e) a circuit (15 and 16 in Fig. 7) configured to generate a distribution of radio-isotope in the subject on the basis of a counting result (column 8, line 67 to column 8, line 2).

In regard to claims 3-7 which are dependent on claim 1, Kamae *et al.* also disclose that in the second case, said position calculation circuit selects one from said not less than two semiconductor cells on the basis of the energy (*e.g.*, a minimum

energy or a maximum energy depending on the Eq. in column 8) of the not less than two signals and the positions (*e.g.*, a first area and a second area) of said not less than two semiconductor cells (column 8, lines 1-24).

In regard to claim 11 which is dependent on claim 1, Kamae *et al.* also disclose that each of said semiconductor cells has a scintillator layer and a photoelectric conversion layer (*i.e.*, plurality of scintillation counters using for example photodiodes, column 11, lines 8-14).

In regard to claim 12, Kamae *et al.* disclose a nuclear medical diagnostic apparatus comprising:

(a) at least one radiation detector (20, 21, and 22 in Fig. 9) having a plurality of semiconductor cells which are arranged in a matrix, detect radiation separately, and output signals representing an energy of the radiation separately (column 6, lines 6-58, column 7, lines 35-44);

(b) a selection circuit (*i.e.*, anticoincidence counter, see Fig. 4C) which causes, among events wherein the radiation is detected, an event wherein not less than two semiconductor cells output not less than two signals substantially simultaneously, not to contribute to imaging, and selects an event derived from radio-isotope injected to a subject (column 1, lines 21-40) on the basis of the energy of the signal (column 7, lines 47-68),

(c) a position calculation circuit configured to calculate an incidence position of the radiation on the basis of positions of said semiconductor cells that output the signals (column 8, lines 1-24);

(d) a counting circuit (15 and 16 in Fig. 7) configured to count the selected event in association of the calculated incidence position (column 8, lines 61-67); and

(e) a circuit (15 and 16 in Fig. 7) configured to generate a distribution of radio-isotope in the subject on the basis of a counting result (column 8, line 67 to column 8, line 2).

In regard to claim 14, Kamae *et al.* disclose a nuclear medical diagnostic apparatus comprising:

(a) at least one radiation detector (20, 21, and 22 in Fig. 9) having a plurality of semiconductor cells which are arranged in a matrix, detect radiation separately, and output signals representing an energy of the radiation separately (column 6, lines 6-58, column 7, lines 35-44);

(b) a position calculation circuit which, in a second case (column 8, lines 1-24) wherein not less than two semiconductor cells output not less than two signals substantially simultaneously, calculates an incidence position of the radiation on the basis of positions of said not less than two semiconductors that output the not less than two signals substantially simultaneously (in a first case, it should be noted that it is inherent in the apparatus Kamae *et al.* to calculate an incidence position of the radiation on the basis of a position of said semiconductor cell that has output the signal since all of the energy of the 511 keV photon has been measured and thus there is no other signal from the rest of the semiconductor cells, column 1, lines 21-40, column 3, lines 40-45);

(c) a counting circuit (15 and 16 in Fig. 7) configured to count an event wherein radiation derived from radio-isotope injected to a subject is detected, in association with the calculated incidence position (column 8, lines 61-67); and

(d) a circuit (15 and 16 in Fig. 7) configured to generated a distribution of the radio-isotope in the subject on the basis of a counting result (column 8, line 67 to column 8, line 2).

In regard to claim 16 which is dependent on claim 14, Kamae *et al.* also disclose that in the second case, said position calculation circuit calculates a barycentric position of the positions of said not less than two semiconductor cells (*i.e.*, each possible position of the not less than two semiconductor cells or sequence is given a weight proportional to the probability, column 8, lines 25-47).

In regard to claim 17 which is dependent on claim 14, Kamae *et al.* also disclose that in the second case, said position calculation circuit calculates, when said two semiconductor cells output signals substantially simultaneously, an incidence position on the basis of one of the positions of said two semiconductor cells (it should be noted Kamae *et al.* teach that there are N! possible sequences of reactions with N! = 2 for 2 signals and thus an incidence position on the basis of one of the positions of the two semiconductor cells will be calculated, column 8, lines 12-27), and when not less than three semiconductor cells output signals substantially simultaneously, a barycentric position of the positions of remaining ones of said plurality of semiconductor cells obtained by excluding said detection element that has output the signal having a maximum energy (*i.e.*, each possible position of the not less than two semiconductor

cells or sequence is given a weight proportional to the probability, column 8, lines 25-47).

In regard to claim 20, Kamae *et al.* disclose a nuclear medical diagnostic apparatus comprising:

(a) at least one radiation detector (20, 21, and 22 in Fig. 9) having a plurality of semiconductor cells which are arranged in a matrix, detect radiation separately, and output signals representing an energy of the radiation separately (column 6, lines 6-58, column 7, lines 35-44); and

(b) a circuit (*i.e.*, anticoincidence counter, see Fig. 4C) which, when not less than two semiconductor cells output not less than two signals substantially simultaneously, calculates a total energy of the not less than two signals (column 7, lines 47-68).

In regard to claim 21 which is dependent on claim 20, Kamae *et al.* also disclose a circuit configured to compare the total energy with a predetermined energy window (column 7, lines 47-68).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 2, 8-9, 13, 15, 18, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kamae *et al.* (US 4,857,737) in view of DiFilippo *et al.* (US 5,793,045).

In regard to claim 2 which is dependent on claim 1, the apparatus of Kamae *et al.* lacks an internal coincidence circuit configured to determine the second case on the basis of a time difference among a plurality of signals output from said radiation detector. DiFilippo *et al.* teach an internal coincidence circuit configured to determine a time difference among a plurality of signals output from said radiation detector in order determine if signals occur within a predetermined time interval (*i.e.*, second case, column 5, lines 33-44). Therefore it would have been obvious to one having ordinary skill in the art to provide an internal coincidence circuit in the apparatus of Kamae *et al.*, in order to determine if signals occur within a predetermined time interval (*i.e.*, second case) as taught by DiFilippo *et al.*

In regard to claim 8 which is dependent on claim 1, the apparatus of Kamae *et al.* lacks a circuit configured to calculate time differences between a signal output from either one of said plurality of semiconductor cells and signals output from remaining ones of said plurality of semiconductor cells. DiFilippo *et al.* teach an internal coincidence circuit configured to determine a time difference among a plurality of signals output from said radiation detector in order determine if signals occur within a predetermined time interval (column 5, lines 33-44). Therefore it would have been obvious to one having ordinary skill in the art to provide an internal coincidence circuit in the apparatus of Kamae *et al.*, in order to determine if signals occur within a predetermined time interval as taught by DiFilippo *et al.*

In regard to claim 9 which is dependent on claim 1, the apparatus of Kamae *et al.* lacks a circuit configured to calculate time differences between a signal output from

either one of said plurality of semiconductor cells and signals output from remaining ones of said plurality of semiconductor cells, and determines the second case on the basis of the time differences. DiFilippo *et al.* teach an internal coincidence circuit configured to determine a time difference among a plurality of signals output from said radiation detector in order determine if signals occur within a predetermined time interval (*i.e.*, second case, column 5, lines 33-44). Therefore it would have been obvious to one having ordinary skill in the art to provide an internal coincidence circuit in the apparatus of Kamae *et al.*, in order to determine if signals occur within a predetermined time interval (*i.e.*, second case) as taught by DiFilippo *et al.*

In regard to claim 13 which is dependent on claim 12 in so far as understood, the apparatus of Kamae *et al.* an internal incidence circuit configured to determine the second case on the basis of a time difference among a plurality of signals output from said radiation detector. DiFilippo *et al.* teach an internal coincidence circuit configured to determine a time difference among a plurality of signals output from said radiation detector in order determine if signals occur within a predetermined time interval (*i.e.*, second case, column 5, lines 33-44). Therefore it would have been obvious to one having ordinary skill in the art to provide an internal coincidence circuit in the apparatus of Kamae *et al.*, in order to determine if signals occur within a predetermined time interval (*i.e.*, second case) as taught by DiFilippo *et al.*

In regard to claim 15 which is dependent on claim 14, the apparatus of Kamae *et al.* lacks an internal coincidence circuit configured to determine the second case on the basis of a time difference among the plurality of signals output from said

radiation detector. DiFilippo *et al.* teach an internal coincidence circuit configured to determine a time difference among a plurality of signals output from said radiation detector in order determine if signals occur within a predetermined time interval (*i.e.*, second case, column 5, lines 33-44). Therefore it would have been obvious to one having ordinary skill in the art to provide an internal coincidence circuit in the apparatus of Kamae *et al.*, in order to determine if signals occur within a predetermined time interval (*i.e.*, second case) as taught by DiFilippo *et al.*

In regard to claim 18, Kamae *et al.* disclose a nuclear medical diagnostic apparatus comprising at least one radiation detector (20, 21, and 22 in Fig. 9) having a plurality of semiconductor cells which are arranged in a matrix, detect radiation separately, and output signals representing an energy of the radiation separately (column 6, lines 6-58, column 7, lines 35-44). The apparatus of Kamae *et al.* lacks a circuit configured to calculate time differences between a signal output from either one of said plurality of semiconductor cells and signals output from remaining ones of said semiconductor cells. DiFilippo *et al.* teach an internal coincidence circuit configured to determine a time difference among a plurality of signals output from said radiation detector in order determine if signals occur within a predetermined time interval (column 5, lines 33-44). Therefore it would have been obvious to one having ordinary skill in the art to provide an internal coincidence circuit in the apparatus of Kamae *et al.*, in order to determine if signals occur within a predetermined time interval as taught by DiFilippo *et al.*

In regard to claim 19 which is dependent on claim 18, the apparatus of Kamae *et al.* lacks a circuit configured to compare the time difference with a predetermined threshold. DiFilippo *et al.* teach an internal coincidence circuit configured to determine a time difference among a plurality of signals output from said radiation detector in order determine if signals occur within a predetermined time interval (*i.e.*, threshold, column 5, lines 33-44). Therefore it would have been obvious to one having ordinary skill in the art to provide an internal coincidence circuit in the apparatus of Kamae *et al.*, in order to determine if signals occur within a predetermined time interval (*i.e.*, threshold) as taught by DiFilippo *et al.*

10. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kamae *et al.* (US 4,857,737) in view of Harris *et al.* (US 5,510,644).

In regard to claim 10 which is dependent on claim 1, the apparatus of Kamae *et al.* lacks that each of said semiconductor cells has a layer made of cadmium telluride or cadmium zinc telluride. Harris *et al.* teach semiconductor cells having a layer made of cadmium telluride in order to obtain a x-ray detector operable at room temperatures (column 2, lines 9-11). Therefore it would have been obvious to one having ordinary skill in the art to provide cadmium telluride as the semiconductor cells in the apparatus of Kamae *et al.*, in order to have a x-ray detector operable at room temperatures as taught by Harris *et al.*

Conclusion

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shun Lee whose telephone number is (703) 308-4860. The examiner can normally be reached on Tuesday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seungsook Ham can be reached on (703) 308-4090. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7724 for regular communications and (703) 308-7724 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

SL
September 25, 2001

SEUNGSOOK HAM
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